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they should furnish sufficient grounds to justify changing the BNA, but if on the other hand they can not, or rather will not, then it follows that they should use the terms as they stand in the BNA.

If we are willing to stand so firmly in the principles of evolution and if we recognize man as but another animal in the long series, it seems entirely justifiable to use the same terms throughout for homologous structures, and certainly for the general space positions and orientations.

Perhaps an open discussion of the matter might be of some interest and effect; concessions might be made on both sides which will give happy results.

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RATE OF DESERT DELTA GROWTH

FROM the presence and position of the alluvial fans which so conspicuously mark some of the old shore-lines of ancient Lake Bonneville, that gigantic precursor of the Great Salt Lake of Utah, it is inferred that during the long period of desiccation which that vast water-body underwent the lowering of the lake level did not take place uniformly but experienced more or less protracted pauses. The most notable of these supposed halts in the recession of the waters is thought to be represented by the embankment denominated the Provo Beach.

The Provo terrace, which lies about 600 feet above the surface of the present Great Salt Lake, and 400 feet below the highest water stage of the ancient lake, is distinguished by extensive alluvial cones which are commonly regarded as true delta deposits. The great magnitude of some of these deltas is interpreted as furnishing conclusive evidence of long tarrying of the old lake waters at this level.

That the unusual size of the Provo deltas is not a necessary consequence of long lagging of lake waters at this stage seems demonstrated by recent extensive observations that enable quantitative calculations to be made of the actual time occupied in desert delta formation. The possible rapidity proves to be very much beyond all ordinary expectations. Concerning the formation of the Provo deltas there are several accelerating factors which do not obtain in the normal desert fans of alluvium that so often collect on the piedmonts at the mouths of canyons. These are the great volumes of nearby morainic materials which filled the valleys of the Wasatch and other ranges, the presence of a convenient water-body in which to concentrate the débris washed out of the canyons, and the position of the Provo level on the line where plain meets mountain.

The alluvial fans characterizing the piedmonts of many desert ranges are usually small, owing largely to the fact no doubt that the mountains have little soil material or coarse rock-waste. In some instances the alluvial débris forms merely a thin veneer over a low cone of the rocky substructure. The out-wash of boulders and pebbles serves rather as a protection against the general lowering of the plains surface through eolian erosion. Not a few of the desert fans have thus really a rock floor just as have the intermont plains themselves, and are not, strictly speaking, alluvial cones at all.

In strong contrast are the desert fans sometimes produced by normal water action. Two instances in particular may be cited in illustration of the actual rapidity with which the process sometimes goes on. Near Ivanpah, in southeastern California, a shallow trench was once dug diagonally down a sloping bajada belt in order to protect a railroad grade from possible wash of sporadic rains. Soon a cloudburst happened to come. In an hour's time a great gully 75 feet deep, 50 feet wide and several miles long was excavated in the soft soil. The bulk of the dirt was redeposited at the foot of the sloping plain in a broad fan of more than a mile radius. In another instance, near Socorro, New Mexico, the bank of an arroyo was cut to take care of future storm-waters. In a single night this spillway was deepened to 50 feet and an alluvial cone nearly 100 feet high and nearly three miles radius was formed.

It is possible and often probable that desert deltas of great size are surprisingly rapid in their growth. When chanced to be restricted by quiet bodies of water, as in the case of old Lake Bonneville, they are rendered so exceptionally conspicuous as to excite wonderment. Therefore the Provo deltas do not necessarily imply very long, or even any, tarrying of Bonneville lake surface at this level. It is possible and even probable that these deltas were actually formed during the regular or uniform recession of the lake waters. Desert delta growth may take place with unexpected rapidity, measurable by days or even hours rather than eons.

Charles Keyes

SCIENTIFIC BOOKS

The Botany of Crop Plants. A text and reference book. By Wilfred W. Robbins. P. Blakiston's Son & Co., Philadelphia, 1917, pp. xix + 681, *f. 263.* Price $2.00.

The Botany of Crop Plants, by Wilfred W. Robbins, of the Colorado Agricultural College, is an important contribution to our textbooks on economic botany. The book has been written to meet a growing demand for a text and reference book which will give the student a knowledge of the botany of common orchard, garden and field crops. To the teacher who is engaged in the teaching of botany, especially the economic phase of the subject, the work of Dr. Robbins will be found of great value.

It has been difficult to refer students to a single text-book giving an adequate discussion of this phase of botany. Botanists are to blame themselves for allowing the economic side of the subject to slip away from them. This book should, therefore, pave the way for a more adequate study of our crop plants from the standpoint of agriculture and horticulture. Botanists should make use of our cultivated plants when it is possible to utilize them to illustrate life processes.

The text-book of Dr. Robbins is divided into two parts; Part I., consisting of 8 chapters, takes up such topics as the fundamental organs of seed plants; the cell, root, stem, leaf, flower, fruit, seed and seedling, classification and naming of plants. When possible the author has used economic plants as a basis for the discussion. This portion of the text is brief, covering only 67 pages. In Part II. the author has arranged the subject from a systematic standpoint. Chapters IX.—XIX. inculsive are devoted to the grasses, first importance being given to the cereals, wheat, oats, barley, rye, maize, sorghum, rice, millet, timothy and sugar cane. Under the subject of wheat he discusses the habit of the plant, root, stem, leaf, inflorescence, spikelet, flower, pollination, artificial cross pollination, fertilization and maturing of grain, ripening stages, the mature grain, *e. g.,* ovary wall or pericarp, testa, nucellus, endosperm, aleurone layer, starchy endosperm, embryo. The author follows this botanical matter with economic phases of the subject as hard and soft wheats, millings of wheat, kinds of flour, germination of wheat, etc. He then discusses the classification of wheats, origin of wheat, environmental relations. In the bibliography some 29 references for purposes of study are referred to. The papers for the most part are accessible. One wonders why the work of Körnicke "Die Getreidearten", which is one of the best of the older works on the subject, is not referred to. However, the student will find the references given valuable in looking up material. Each one of the other cereals is taken up in the same way.

A short chapter is devoted to timothy. It would have added to the value of this chapter if some of the other forage grasses had been considered, say blue grass, which is the most important pasture plant of the northern states. This review would be unduly lengthened, should I refer to the other economic plants he has considered. Mention may, however, be made of the treatment found under the head of Moraceæ, in which the mulberry, hop, fig and hemp are taken up. In the account of the fig there is an adequate statement on pollination. This chapter, like others, gives some important references. In some cases, however, some important references are omit-